

REMARKS

Claims 1, 2, 4-6, 8-10, 12, 14-16, 18-20, 22-26, 29-41, 43-48, 51-54, 56-58, 60-68, and 71-82 are pending, with claims 1, 9, 12, 19, 22, 30, 34, 43, 45, 52, 53, 61, 64 and 72 being independent. Claims 79-82 are new. Claims 3, 11, 13, 21, and 55 are cancelled. Claims 1, 4-6, 9, 12, 14-16, 19, 22, 30, 34, 43, 45, 46, 52, 53, 56-58, 61, 64, and 72 have been amended. No new matter has been added. Reconsideration and allowance of the above-referenced application are respectfully requested.

Rejections Under 35 U.S.C. §§ 102 & 103

I. Claims 1, 2, 9-12, 19-24, 26, 30-35, 43-46, 52-54, 68, and 72-78 stand rejected under 35 U.S.C. §102(e) as allegedly being anticipated by U.S. Patent No. 7,136,244 issued to Rothberg. (hereinafter “Rothberg”). This contention is respectfully traversed.

Independent claim 1 has been amended and now recites in part "an input to receive a signal, wherein the signal from the input comprises an analog signal; an analog-to-digital converter (ADC) to convert the analog signal to a digital signal; a buffer responsive to the ADC to store the digital signal; a filter in communication with the ADC to produce a filtered digital signal based on the digital signal; a detector responsive to the filter to interpret the filtered digital signal as discrete values; an averaging circuit in communication with the buffer and the detector to cause interpretation, by the detector during a retry mode, of a new signal comprising an average that is determined responsive to a group of signals, the group of signals comprising one or more previous signals stored in the buffer and a current signal; a control circuit that determines whether the discrete values are adequately indicated based on output of the detector, that initiates the retry mode when the discrete values are not adequately indicated, and that determines whether the discrete values are adequately indicated from the interpretation of the new signal in the retry mode; and an error correction circuit in communication with the detector and the averaging circuit to provide a signal quality metric that is based on output of the detector, wherein the control circuit uses the signal quality metric to include a signal of the group of

signals in the average or exclude a signal of the group of signals from the average" (emphasis added). The prior art fails to teach or suggest each and every feature of claim 1.

Rothberg describes "If an error occurs while attempting to read one of the data sectors, a retry operation is executed in an attempt to recover the errant data sector" and "Averaged read data is generated over multiple retry operations, and the averaged read data processed to recover the errant data sector" (See Abstract). Rothberg discloses an averaging operation as "a number of estimated data sequences $32_0 - 32_N$ averaged together to generate the estimated data sequence 34 comprising the averaged data bits" (col. 4, lines 1-4). Additionally, Rothberg discloses at "step 68 the target sector is read N times and the resulting read data averaged" (col. 8, lines 54-56). Similar to the previously cited portion of Rothberg, Rothberg uses all N of the read data. Rothberg fails to teach or suggest an averaging circuit in communication with the buffer and the detector to cause interpretation, by the detector during a retry mode, of a new signal comprising an average that is determined responsive to a group of signals, the group of signals comprising one or more previous signals stored in the buffer and a current signal, wherein the control circuit uses the signal quality metric to include a signal of the group of signals in the average or exclude a signal of the group of signals from the average. For at least these reasons, claim 1 is allowable over Rothberg.

Independent claim 9 has been amended and now recites in part "an input to receive a signal, wherein the signal from the input comprises an analog signal; an analog-to-digital converter (ADC) to convert the analog signal to a digital signal; a buffer responsive to the ADC to store the digital signal; a filter in communication with the ADC to produce a filtered digital signal based on the digital signal; a detector responsive to the filter to interpret the filtered digital signal as discrete values; an averaging circuit in communication with the buffer and the detector to cause interpretation, by the detector during a retry mode, of an averaged signal comprising a weighted average of one or more previous signals stored in the buffer and a current signal; and a control circuit that determines whether the discrete values are adequately indicated based on output of the detector, that initiates the retry mode when the discrete values are not adequately indicated, and that determines whether the discrete values are adequately indicated

from the interpretation of the averaged signal in the retry mode, wherein the control circuit determines whether the discrete values are adequately indicated based on comparison of interpretations of the averaged signal and the current signal,wherein the averaging circuit determines the weighted average based on weights respectively associated with the one or more previous signals and the current signal, wherein the weights are based on respective signal quality measures, and wherein the signal quality measures are based on output of the detector" (emphasis added). The prior art fails to teach or suggest each and every feature of claim 9.

Rothberg fails to teach or suggest an averaging circuit in communication with the buffer and the detector to cause interpretation, by the detector during a retry mode, of an averaged signal comprising a weighted average of one or more previous signals stored in the buffer and a current signal. Further, Rothberg fails to teach or suggest wherein the averaging circuit determines the weighted average based on weights respectively associated with the one or more previous signals and the current signal, wherein the weights are based on respective signal quality measures, and wherein the signal quality measures are based on output of the detector. For at least these reasons, claim 9 is allowable over Rothberg.

Independent claim 12 has been amended and now recites in part "a storage medium; a head assembly operable to generate an analog read signal from the storage medium; an analog-to-digital converter (ADC) to convert the analog read signal to a digital read signal; a buffer that saves the digital read signal; a filter in communication with the ADC to produce a filtered digital read signal based on the digital read signal; a detector that interprets the filtered digital read signal as discrete values; an averaging circuit in communication with the buffer and the detector; a control circuit in communication with the averaging circuit to determine whether the discrete values are adequately indicated based on output of the detector, initiate a retry mode when the discrete values are not adequately indicated, cause interpretation by the detector in the retry mode of a new read signal comprising an average that is determined responsive to a group of signals, the group of signals comprising one or more previous signals stored in the buffer and a current read signal, and determine whether the discrete values are adequately indicated from the interpretation of the new read signal in the retry mode; and an error correction circuit in

communication with the detector and the averaging circuit to provide a signal quality metric that is based on output of the detector, wherein the control circuit uses the signal quality metric to include a signal of the group of signals in the average or exclude a signal of the group of signals from the average" (emphasis added). For at least reasons similar to one or more of the reasons noted above, claim 12 is allowable over Rothberg.

Independent claim 19 has been amended and now recites in part "a storage medium; a head assembly operable to generate an analog read signal from the storage medium; an analog-to-digital converter (ADC) to convert the analog read signal to a digital read signal; a buffer that saves the digital read signal; a filter in communication with the ADC to produce a filtered digital read signal based on the digital read signal; a detector that interprets the filtered digital read signal as discrete values; an averaging circuit in communication with the buffer and the detector; and a control circuit in communication with the averaging circuit to determine whether the discrete values are adequately indicated based on output of the detector, initiate a retry mode when the discrete values are not adequately indicated, cause interpretation by the detector in the retry mode of an averaged read signal comprising a weighted average of one or more previous read signals stored in the buffer and a current read signal, and determine whether the discrete values are adequately indicated from the interpretation of the averaged signal in the retry mode, wherein the averaging circuit determines the weighted average based on weights respectively associated with the one or more previous signals and the current signal, wherein the weights are based on respective signal quality measures, and wherein the signal quality measures are based on output of the detector" (emphasis added). For at least reasons similar to one or more of the reasons noted above, claim 19 is allowable over Rothberg.

Independent claim 22 has been amended and now recites in part "interpreting an input signal as discrete values; deciding whether the discrete values have been adequately interpreted from the input signal; entering a retry mode in response to a decision that the discrete values have not been adequately interpreted from the input signal; obtaining, in the retry mode, second signals representing same data as the input signal; obtaining signal quality metrics corresponding

to the second signals and the input signal; averaging, in the retry mode, multiple signals to produce an averaged signal to improve interpretation of the input signal, the multiple signals including at least two or more of the input signal and the second signals, wherein the averaging comprises using the signal quality metrics to include a respective signal in the averaged signal or exclude the respective signal from the averaged signal; interpreting the averaged signal as new discrete values; and determining whether the new discrete values are adequately indicated" (emphasis added). For at least reasons similar to one or more of the reasons noted above, claim 22 is allowable over Rothberg.

Independent claim 30 has been amended and now recites in part "interpreting an input signal as discrete values; deciding whether the discrete values have been adequately interpreted from the input signal; entering a retry mode in response to a decision that the discrete values have not been adequately interpreted from the input signal; obtaining, in the retry mode, one or more second signals representing same data as the input signal; averaging, in the retry mode, multiple signals to improve interpretation of the input signal, wherein the averaging includes determining a weighted average based on weights, the input signal, and the one or more second signals to produce an averaged signal, wherein the weights correspond, respectively, to the input signal and the one or more second signals, wherein the weights are based on respective signal quality measures; interpreting the averaged signal as new discrete values; and determining whether the new discrete values are adequately indicated, wherein determining whether the new discrete values are adequately indicated comprises comparing interpretations of the averaged signal and of the one or more second signals" (emphasis added). For at least reasons similar to one or more of the reasons noted above, claim 30 is allowable over Rothberg.

Independent claim 34 has been amended and now recites in part "means for averaging, in the retry mode, multiple read signals to produce an averaged signal to improve signal interpretation, the means for averaging including: means for obtaining second signals representing same data as the input signal, the multiple read signals including at least two or more of: the input signal and the second signals, means for obtaining signal quality metrics

corresponding to the second signals and the input signal, means for using the signal quality metrics to include a respective signal in the averaged signal or exclude the respective signal from the averaged signal, means for interpreting the averaged signal as new discrete values, and means for determining whether the new discrete values are adequately indicated, wherein the means for reading further includes error-detection means for controlling which read signals are averaged" (emphasis added). For at least reasons similar to one or more of the reasons noted above, claim 34 is allowable over Rothberg.

Independent claim 43 has been amended and now recites in part "means for averaging, in the retry mode, multiple read signals to produce an averaged signal to improve signal interpretation, the means for averaging including: means for obtaining one or more second signals representing same data as the input signal, means for determining a weighted average based on weights, the input signal, and the one or more second signals to produce an averaged signal, wherein the weights correspond, respectively, to the input signal and the one or more second signals, wherein the weights are based on respective signal quality measures; means for interpreting the averaged signal as new discrete values, and means for determining whether the new discrete values are adequately indicated; wherein the means for reading further includes means for comparing an averaged read signal and a current read signal" (emphasis added). For at least reasons similar to one or more of the reasons noted above, claim 43 is allowable over Rothberg.

Independent claim 45 has been amended and now recites in part "means for averaging, in the retry mode, multiple read signals to produce an averaged signal to improve signal interpretation, the means for averaging including: means for obtaining second signals representing same data as the input signal, the multiple read signals including at least two or more of: the input signal and the second signals, means for obtaining signal quality metrics corresponding to the second signals and the input signal, means for using the signal quality metrics to include a respective signal in the averaged signal or exclude the respective signal from

the averaged signal" (emphasis added). For at least reasons similar to one or more of the reasons noted above, claim 45 is allowable over Rothberg.

Independent claim 52 has been amended and now recites in part "means for averaging, in the retry mode, multiple read signals to produce an averaged signal to improve signal interpretation, the means for averaging including: means for obtaining one or more second signals representing same data as the input signal, means for determining a weighted average based on weights, the input signal, and the one or more second signals to produce an averaged signal, wherein the weights correspond, respectively, to the input signal and the one or more second signals, wherein the weights are based on respective signal quality measures" (emphasis added). For at least reasons similar to one or more of the reasons noted above, claim 52 is allowable over Rothberg.

Independent claim 53 has been amended and now recites in part "means for receiving a signal, wherein the signal comprises an analog signal; means for converting the analog signal to a digital signal; means for storing the digital signal; means for filtering the digital signal; means for interpreting the filtered digital signal as discrete values; retry-mode means for interpreting a new signal comprising an average that is determined responsive to a group of signals, the group of signals comprising one or more stored signals and a current signal; means for determining whether the discrete values are adequately indicated based on output of the means for interpreting, initiating the retry-mode means when the discrete values are not adequately indicated, and determining whether the discrete values are adequately indicated from the interpretation of the new signal by the retry-mode means; means for providing a signal quality metric that governs which signals are averaged; and means for using the signal quality metric to include a corresponding signal in the average or exclude the corresponding signal from the average" (emphasis added). For at least reasons similar to one or more of the reasons noted above, claim 53 is allowable over Rothberg.

Independent claim 61 has been amended and now recites in part "means for receiving a signal, wherein the signal comprises an analog signal; means for converting the analog signal to a digital signal; means for storing the digital signal; means for filtering the digital signal; means for interpreting the filtered digital signal as discrete values; retry-mode means for interpreting an averaged signal that is based on a weighted average of one or more stored signals and a current signal, wherein the weighted average is determined based on weights respectively associated with the one or more stored signals and the current signal, wherein the weights are based on respective signal quality measures; and means for determining whether the discrete values are adequately indicated based on output of the means for interpreting, initiating the retry-mode means when the discrete values are not adequately indicated, and determining whether the discrete values are adequately indicated from the interpretation of the averaged signal by the retry-mode means; wherein the means for determining comprises means for determining whether the discrete values are adequately indicated based on comparison of interpretations of the averaged signal and the current signal" (emphasis added). For at least reasons similar to one or more of the reasons noted above, claim 61 is allowable over Rothberg.

Independent claim 64 has been amended and now recites in part "obtaining, in the retry mode, second signals representing same data as the input signal; obtaining signal quality metrics corresponding to the second signals and the input signal; averaging, in the retry mode, multiple signals to produce an averaged signal to improve interpretation of the input signal, the multiple signals including at least two or more of the input signal and the second signals, wherein the averaging comprises using the signal quality metrics to include a respective signal in the averaged signal or exclude the respective signal from the averaged signal" (emphasis added). For at least reasons similar to one or more of the reasons noted above, claim 64 is allowable over Rothberg.

Independent claim 72 has been amended and now recites in part "obtaining, in the retry mode, one or more second signals representing same data as the input signal; averaging, in the retry mode, multiple signals to improve interpretation of the input signal, wherein the averaging

includes determining a weighted average based on weights, the input signal, and the one or more second signals to produce an averaged signal and to improve signal interpretation, wherein the weights correspond, respectively, to the input signal and the one or more second signals, wherein the weights are based on respective signal quality measures" (emphasis added). For at least reasons similar to one or more of the reasons noted above, claim 72 is allowable over Rothberg.

The dependent claims corresponding to the above identified independent claims are at least allowable because their respective independent base claims are allowable.

II. Claims 3-6, 8, 13-16, 18, 25, 29, 36-41, 47, 48, 51, 55-58, 60, 67, and 71 stand rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Rothberg and U.S. Patent No. 6,519,715 issued to Takashi et al. (hereinafter "Takashi"). This contention is respectfully traversed.

Takashi describes signal processing apparatus and a data recording and reproducing apparatus including local memory processor. Takashi fails to cure the above identified deficiencies of Rothberg. Claims 3, 13 and 55 have been cancelled. Thus, dependent claims 4-6, 8, 14-16, 18, 25, 29, 36-41, 47, 48, 51, 56-58, 60, 67, and 71 are at least allowable because their respective independent base claims are allowable over Rothberg and Takashi.

CONCLUSION

The foregoing comments made with respect to the positions taken by the Office are not to be construed as acquiescence with other positions of the Office that have not been explicitly contested. Accordingly, the above arguments for patentability of a claim should not be construed as implying that there are not other valid reasons for patentability of that claim or other claims.

In view of the remarks herein, claims 1, 2, 4-6, 8-10, 12, 14-16, 18-20, 22-26, 29-41, 43-48, 51-54, 56-58, 60-68, and 71-82 should be in condition for allowance. A formal notice of allowance is respectfully requested.

Please apply any necessary charges or credits to deposit account 06-1050.

Respectfully submitted,

05/31/11
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